Seasonal Influenza Vaccination Policies in the Eastern Mediterranean Region: Current State and the Way Forward

Abstract

Background: The World Health Organization recommends annual influenza vaccination especially in high-risk groups. Little is known about the adoption and implementation of influenza vaccination policies in the Eastern Mediterranean Region.

Methods: A survey was distributed to the 22 EMR country representatives at the Ministries of Health between December 2016 and February 2017 to capture data on influenza immunization policies, recommendations, and practices in place.

Results: Of the 20 Eastern Mediterranean Region member states that responded to the survey, fourteen reported having influenza immunization policies during the 2015/2016 influenza season. All member states with an influenza immunization policy recommended vaccination for persons with chronic medical conditions, health-care workers, and pilgrims. However, two countries fell short of targeting pregnant women. Eight countries used the northern hemisphere formulation, one used the southern hemisphere formulation, and nine used both. Vaccination coverage was not monitored by all member states and for all target groups, yet reported coverage of a number of target groups (i.e. health-care workers, children) was generally low. Furthermore, data on the burden of influenza and vaccine protection was scarce in the region.

Conclusions: The 2015/2016 survey permitted a regional assessment of national influenza immunization policies. Addressing disparities in influenza vaccine accessibility and strengthening surveillance systems may enhance influenza vaccine introduction and use.

Keywords: Influenza, vaccination, survey, policy, Eastern Mediterranean Region

1. Background

Seasonal influenza is an acute viral infection that affects people of all age groups worldwide. As per the World Health Organization (WHO) estimates, influenza viruses infect between 5%–15% of the global population, annually causing an estimated 3-5 million severe cases and up to 650,000 respiratory deaths [1]. Annual seasonal epidemics have also been associated with significant health care costs and productivity losses [2,3].

Annual vaccination is the cornerstone for preventing infection, severe disease, and mortality due to influenza [4]. Vaccination against influenza is particularly important for individuals at high risk for disease complications and those caring for them., The WHO recommends annual influenza vaccination for pregnant women at any stage of pregnancy, children aged between 6 months to 5 years, elderly individuals (> 65-year-old), individuals with chronic medical conditions, and health-care workers (HCWs) [1]. In countries where influenza vaccination programmes are still at their early stages or not well developed, the WHO recommends prioritizing vaccination for pregnant women, whereas other risk groups are not ranked by priority [5]. On the other hand, the United States Centre for Disease Control and Prevention (CDC) has taken a more universal approach recommending the use of annual influenza vaccine for all persons aged ≥6 months [6]. However, during a vaccine shortage, the CDC recommends that vaccination efforts be focused on high-risk groups only with no order by priority [6].

The WHO Eastern Mediterranean Region (EMR), which consists of 22 member states (Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates (UAE), and Yemen) is home for nearly 10% of

the world's population. However, the region's share of influenza vaccines is roughly 2.2% of the globally distributed doses [7]. Noteworthy, the EMR falls on a number of migratory birds' flyways and is thus at risk for the emergence of novel influenza viruses [8]. Therefore, we undertook a survey to assess the adoption and implementation of influenza vaccination policies in the EMR to provide the data needed for evaluating and developing guidelines for influenza prevention with the goal of enhancing vaccination coverage.

2. Method

The survey consisted of a 38-item questionnaire that was developed based on available relevant literature pertaining to influenza vaccination. The self-administered survey was distributed by email to the country representatives between December 2016 and February 2017. The survey included questions on: mechanisms in place to monitor influenza vaccination coverage; vaccination coverage; existence of national recommendations for vaccination; and planned policies with regard to the national influenza immunization programme.

3. Results

Response rate

In total, 20countries from across the WHO EMR completed the questionnaire resulting in a response rate of 90.9%. Responses were not received from Bahrain and Djibouti.

Seasonal influenza vaccination policies

Among the 20 countries for which the data were available, fourteen (70%) reported having seasonal influenza vaccination policies at the time surveyed (Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, and UAE). Of the above member states, five reported including the influenza vaccine in their national immunization program (Iran, Libya, Qatar, Syria, and Tunisia).

Morocco and Somalia, on the other hand, reported having plans regarding the implementation of official influenza vaccination policies in the next 5 years.

Seasonal influenza surveillance for the 2015/2016 season

Of the 20 member states, seventeen (85%) reported having active influenza surveillance systems (Afghanistan, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, and Yemen). All but one member state (Pakistan) reported using existing surveillance systems to guide policymakers and to help ensure well-informed policy decisions.

While mortality surveillance data for influenza were reportedly amassed by 16 (80%) countries (Afghanistan, Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Morocco, Oman, Palestine, Saudi Arabia, Sudan, Syria, Tunisia, UAE, and Yemen), only ten provided mortality rates (Egypt, Iran, Iraq, Jordan, Kuwait, Morocco, Oman, Syria, Tunisia, and Yemen). These ranged from 0% in Jordan to 15% in Morocco during the 2015/2016 season. Fifteen (75%) countries also reported collecting data on influenza-associated hospitalizations (Afghanistan, Egypt, Iran, Iraq, Jordan, Kuwait, Morocco, Oman, Pakistan, Palestine, Saudi Arabia, Syria, Tunisia, UAE, and Yemen), yet only nine provided data on hospitalization rates (Egypt, Iran, Iraq, Jordan, Morocco, Oman, Syria, Tunisia, and Yemen). Hospitalization rates ranged from 0.004% in Iran to 21.7% in Iraq.

Influenza vaccine recommendations

i. Children

Among the countries having an influenza vaccination policy during the 2015/2016 season, two countries, Libya and Qatar, included seasonal influenza vaccine in the childhood immunization schedule. Qatar targeted children <5 years of age. No specific age group was provided by Libya.

ii. Adults

Four member states had influenza vaccination recommendations for adults during 2015/2016. Countries recommending vaccination against influenza for adults were:

Oman, Qatar, Syria, and UAE. Oman and Qatar provided information on the age groups targeted, indicating that influenza vaccination was recommended for persons >60 years of age.

iii. Chronic illnesses

All member states with recommendations for influenza vaccination recommended the influenza vaccine for persons with chronic illnesses (e.g. diabetes, asthma, renal disease, etc.) (Table 1). All but two countries, Jordan and Lebanon, recommended influenza vaccination for persons with immunological disorders and/or HIV/AIDS. Ten countries recommended vaccination for individuals with morbid obesity (Egypt, Iran, Iraq, Kuwait, Libya, Palestine, Saudi Arabia, Syria, Tunisia, and UAE), and nine recommended vaccination for those with spinal cord injuries and disorders that can result in pulmonary impairments and respiratory illness complications (Iran, Iraq, Kuwait, Libya, Palestine, Qatar, Saudi Arabia, Syria, and Tunisia). However, only five countries recommended vaccination for individuals on long-term aspirin use (Iraq, Kuwait, Lebanon, Qatar, and Saudi Arabia).

iv. Pregnant women

Annual vaccination of pregnant women was recommended by all member states where an influenza vaccination policy exists, except Egypt and Lebanon, which had no specific recommendation for this group (Table 2). On the other hand, only Iraq, Kuwait, and Libya recommended maternal influenza vaccination during the early postpartum period.

v. HCWs

All member states with an influenza vaccination policy had recommendations for vaccination of hospital personnel against influenza during the 2015/2016 season (Table 3). All but two member states (Lebanon and Syria) also recommended influenza vaccination for laboratory workers. Furthermore, eleven countries recommended seasonal influenza vaccination for persons working at long-term care facilities (Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Oman, Palestine, Qatar, Saudi

Arabia, and UAE), and ten countries recommended vaccination for persons working at out-patient care clinics (Egypt, Iraq, Jordan, Kuwait, Libya, Oman, Palestine, Qatar, Saudi Arabia, and UAE).

vi. *Occupational groups (non-health care settings)*

A smaller number of countries reported having influenza vaccine recommendations for one or more occupational groups (Table 4). Eleven member states recommended influenza vaccination for investigators of human influenza outbreaks (Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Palestine, Qatar, Saudi Arabia, Syria, and Tunisia), yet only seven recommended vaccination for investigators of animal influenza outbreaks (Egypt, Iran, Iraq, Libya, Qatar, Saudi Arabia, and Tunisia). Furthermore, seven countries recommended seasonal influenza vaccination for airline crew members (Egypt, Iran, Iraq, Kuwait, Qatar, Tunisia, and UAE). For essential and emergency services (e.g. police, fire, and rescue staff), vaccination was recommended by six countries (Iran, Iraq, Kuwait, Libya, Tunisia, and UAE). Likewise, vaccination of military personnel was also recommended by six countries (Iran, Iraq, Kuwait, Libya, Oman, and Tunisia). Egypt, Iran, Iraq, Libya, and Tunisia had recommendations in place for persons working in the animal sector. Iraq was the only country in the region that had recommendations for families raising pigs, poultry, and/or waterfowl.

vii. *Other risk groups*

Eight countries recommended seasonal influenza vaccination for persons living at long-term care facilities (e.g. nursing homes and other chronic-care facilities) (Iran, Iraq, Jordan, Kuwait, Libya, Palestine, Qatar, and Tunisia) (Table 5). Furthermore, four countries had influenza vaccination recommendations for all household members and caregivers of children younger than 5 years of age and persons aged 50 years and older (Kuwait, Libya, Tunisia, and UAE). In addition, six countries had recommendations for all household contacts of persons at high risk for influenza complications (e.g. individuals with chronic medical conditions; the

immunosuppressed; the elderly; children aged <6 months i.e. cocooning strategy) (Iran, Kuwait, Libya, Syria, Tunisia, and UAE).

viii. *Pilgrims, expatriates, and refugees*

Annual influenza vaccination of pilgrims was recommended by all member states with an influenza vaccination policy (Table 6). On the other hand, only five countries recommended influenza vaccination for refugees (Iraq, Kuwait, Libya, Syria, and Tunisia), and none recommended vaccination for expatriates.

Vaccination monitoring and coverage

Six countries reported data on influenza vaccination coverage among high-risk groups during the 2015/2016 season. These were Egypt, Jordan, Kuwait, Morocco, Oman, and Saudi Arabia. Kuwait was the only country in the Region that provided coverage data for children >5 years of age, reporting a vaccination rate of only 2%. Data on vaccination coverage for pregnant women was also reported by one country (Oman), where the vaccination rate was 90%. Three countries, on the other hand, provided information on coverage for persons with specific illnesses; vaccination uptake in this target group ranged from 2% for non-communicable disease (NCD) patients in Kuwait to >70% for high-risk patients in Saudi Arabia. Furthermore, information on coverage among HCWs was provided by six countries and ranged from 39% in Kuwait to 100% in Egypt. Finally, three of the 14 member states recommending influenza vaccination for pilgrims in 2015/2016 reported data on coverage; vaccination coverage was 100% in all the three countries.

Formulation and type of seasonal influenza vaccine

Eighteen countries provided information on vaccine formulation used, and of these, eight used the northern hemisphere formulation (Iran, Jordan, Lebanon, Morocco, Pakistan, Palestine, Syria, and Tunisia), one used the southern hemisphere formulation (Sudan), and nine used both formulations (Egypt, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, UAE, and Yemen).

Seventeen countries, on the other hand, provided information on the type(s) of influenza vaccine licensed for use. Thirteen (76.4%) countries reported using inactivated trivalent influenza vaccines (Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Syria, and Tunisia), three (17.6%) reported using inactivated quadrivalent influenza vaccines (Palestine, Qatar, and Tunisia), and one (7.6%) reported using the high-dose, inactivated, trivalent influenza vaccine (Libya). Sudan (7.6%) was the only country in the Region that used the live-attenuated trivalent influenza vaccine.

Seasonal influenza vaccine providers and principal outlets for vaccination

Seventeen countries reported data on seasonal influenza vaccine providers and principal outlets for administration. Influenza vaccine was available solely through the public sector in four (20%) countries (Iran, Iraq, Sudan, and Tunisia). In the remaining 13 (65%), influenza vaccine was available through both the public and the private sectors (Egypt, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Syria, and UAE).

The principal outlets for seasonal influenza vaccination reported by 14 (70%) countries were primary health care centers, hospitals, and out-patient care clinics (Egypt, Iran Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, and UAE). Furthermore, seven (35%) countries reported providing influenza vaccines through community pharmacies, albeit to a lesser extent than hospitals and clinics (Egypt, Lebanon, Morocco, Oman, Pakistan, Palestine, and Syria). Occupational health services and schools, on the other hand, were reported to be the least common outlets for the administration of seasonal influenza vaccine.

Promotion of seasonal influenza vaccination

The majority of countries (n=14) reported the use of a wide range of media activities as tools to foster vaccination programs (Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Tunisia, and UAE). The primary media activities used included television and radio advertising, leaflets, posters, and emails.

Future plans

Nine (45%) member states identified a number of planned strategies and operational policy changes needed to address the existing influenza vaccination impediments faced by most countries (Egypt, Kuwait, Libya, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, and UAE). Kuwait, for instance, has planned to implement regular influenza immunization campaigns for high-risk groups. Furthermore, Egypt has intended to expand the recommended groups for annual influenza immunization to include university students and vulnerable groups. Saudi Arabia has also prepared a plan to incorporate influenza vaccine in the national immunization schedule. Other plans included covering all risk groups in 2018 and progressing towards universal coverage by 2020 (Libya), adopting a recommendation of vaccination of people aged >60 years and <2 years (Oman), implementing seasonal influenza vaccination policies targeting persons at high risk identified by the WHO (Morocco), as well as strengthening existing surveillance systems (Palestine). Somalia expressed interest in implementing a vaccination policy for influenza but highlighted the need for guidance on development of the policy, surveillance systems for influenza, capacity building, purchase of vaccines, and vaccination activities in the country.

4. Discussion

The 2015/2016 survey permitted a regional summary of the national influenza immunization policies. In general, our survey reveals an increase in the number of countries adopting an influenza immunization policy. Previously, a joint WHO/UNICEF report identified 12 countries in the EMR with seasonal influenza immunization policies in 2014 [9]. Whereas, our survey identified 14 EMR member states with influenza immunization policies in 2015/2016. Although trivial, the increased policy adoption reflects an improved awareness regarding influenza and the importance of vaccination in mitigating its burden. The findings provide essential information on the aspects that are critical for improving and strengthening the influenza vaccination policies and practices.

Surveillance of influenza is essential for the selection of appropriate vaccine strains and rapid detection of novel subtypes in humans [10]. Local surveillance data

provides country-specific information on the time and type of circulating influenza strains, which enables an informed-decision on the choice of the vaccine formulation to use. Local morbidity and mortality data are also required to provide a more complete picture of the burden of disease, which, in turn, is critical for the appreciation of threat of influenza to public health. This also provides evidence-based data needed for advocacy and assists in the development and updates of the prevention, control, and mitigation policies for influenza [10]. Seventeen out of the 22 EMR countries reported conducting surveillance for influenza. In fact, sixteen national laboratories in 15 countries are currently designated as National Influenza Centres, thirteen of which are tasked with detecting and isolating influenza [11]. Representative specimens are periodically shipped to the WHO collaborating centers for further analysis which provides data for vaccine strain selection. The number of influenza specimens reported to FluNet from participating centres in the EMR increased from 32,345 in 2011 to 66,000 in 2015 [11]. Currently, either one or both, the Northern and Southern Hemisphere vaccine formulations, are in use in the EMR countries. The increase in the availability of the local ERM influenza data will help optimize the recommendations for vaccine formulations in the EMR.

Seasonal influenza is a substantial cause of severe illness and hospitalization among infants younger than six months of age [12]. Studies found that, in many cases, the rate of hospitalization of children aged <6 months is three times that of children in the subsequent age group [12]. However, prevention of flu in this age group is problematic due to the absence of an approved vaccine, which, in turn, highlights the crucial need for other preventive strategies [12]. There is strong evidence to suggest that vaccinating pregnant women protects their newborn children for up to 6 months after they are born [13]. In fact, giving influenza vaccine to pregnant women was 91.5% effective in preventing hospitalization of infants due to influenza[14].Worth mentioning, not only does vaccinating pregnant women protect infants, but it also prevents influenza infection and its dramatic effects during pregnancy, ranging from miscarriages, to preterm deliveries and a high maternal mortality rate [13,15,16]. Nonetheless, influenza vaccination policies in two countries in the region fell short of recommending maternal influenza vaccination, and only one country reported on influenza vaccination rates within this population. In addition to vaccinating pregnant women, the American

Academy of Pediatrics and the Centers for Disease and Control Prevention recommend "cocooning" as a method to protect young infants from seasonal influenza by ensuring all family members and close contacts receive the vaccine [17,18]. Despite this, only six countries recommended vaccination for household contacts and caregivers of children aged <6 months in the EMR, and none reported on influenza vaccination rates within this group. Therefore, evidence-based data on influenza outcomes in infants in the EMR is critically needed to emphasize on the importance of this prevention strategy.

Certain avian influenza viruses are potential zoonotic disease agents that may be transmitted from infected poultry to humans [19]. As such, poultry workers and veterinarians have an occupational risk of exposure to avian influenza viruses [19]. Five countries (Egypt, Iran, Iraq, Libya, and Tunisia) in the EMR had recommendations in place for persons working in the animal sector, all of which have experienced outbreaks of avian influenza) [20–24]. In particular, cases of human illnesses with H5N1 virus infection were detected in Egypt every year from 2006 to 2016 [25–28]. During the ten year period, a total of 363 human cases with influenza (H5N1) virus infection, including 116 deaths, were reported in Egypt [29]. Nonetheless, the rational for vaccinating poultry workers with human influenza vaccine is not clear since there is no evidence that these vaccines protect against heterotypic avian influenza viruses [30]. One reason would be that vaccination of this group against human influenza can reduce the potential for an infection with a human virus, thus, minimizing the chance for a co-infection with an avian virus and the possibility of a subsequent reassortment event to occur between these viruses [31].

As the world's largest mass movement and gathering of people, the annual Hajj pilgrimage to Mecca creates an optimal environment for the spread of respiratory infections including influenza [32–34]. Nearly 40% of pilgrims suffer from respiratory symptoms during Hajj, with influenza virus being one of the most common etiologies [33,35,36]. The Ministry of Health (MOH) of Saudi Arabia recommends that all pilgrims, particularly those at increased risk of severe influenza disease including pregnant women, receive the most recent influenza vaccine before departing for the Hajj [37,38]. In accordance with the Saudi MOH recommendations, fourteen EMR member states

recommended pre-departure vaccination for all their pilgrims, yet only three reported on influenza vaccination rates among this group. On the positive side, universal coverage among this population was reported in all three EMR countries. These data suggest satisfactory compliance with the vaccine recommendation. Yet, in view of the limited number of countries reporting on influenza vaccination rates among pilgrims, the available data are not sufficiently representative. Furthermore, the reported data contradicted with those in the literature. For instance, one study found that only 19.4% of Egyptian pilgrims were found to be vaccinated against influenza in the 2015 Hajj season [39]. Another study by Memish et al. reported that only 22% of the Hajj pilgrims from 22 countries (including some EMR countries) received the influenza vaccine in 2013[40].

The accessibility of vaccines is one of the key barriers to improving vaccination rates, including for influenza [41]. Given their ubiquitous distribution, extended working hours, and walk-in policies, pharmacists are in an ideal position to provide influenza vaccines to the community and thus support the increase of immunization uptake [42,43]. For instance, a study by Steyer et al. demonstrated an increase in influenza immunization rates in the United States among persons aged 65 years and older following pharmacist involvement in influenza vaccination programmes [44]. This is consistent with data from Canada that showed an increase in influenza immunization rates when allowing pharmacists to administer influenza vaccines [44]. Of note, the impact appeared to be the greatest among persons aged 65 years and older [44]. This may relate to the fact that elderly present to pharmacies more frequently than younger people, giving more opportunity for pharmacists to engage in recommending vaccination to this age group. In the EMR, only seven countries reported providing influenza vaccines through community pharmacies, suggesting that the impact of allowing pharmacists to provide influenza vaccines on the uptake of seasonal influenza immunization is under appreciated in the region. Considering policies to expand the pharmacists' role in immunization could improve the accessibility of influenza vaccination in the region and enhance vaccination rates.

In conclusion, despite widespread policy recommendations on influenza vaccination, attaining high coverage rates among the various populations including those

at risk continues to be a challenge in the EMR, as does the availability of influenza vaccines. In fact, in spite of the increase from previous years, the number of influenza vaccine doses distributed in the EMR in 2015 comprised only 2.2% of the global market [7]. Effective communication of influenza vaccination policies and strong advocacy initiatives are warranted to improve awareness of the public and health professionals about influenza and vaccines. In addition, equitable distribution and access to influenza vaccines will be critical for increasing uptake. Finally, encouraging and investing in influenza surveillance and research could be particularly valuable for controlling influenza in the EMR. Such research is important for making informed decisions on influenza vaccine introduction and expansion.

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Table 1

Seasonal influenza vaccine recommendations for clinical risk groups by EMR countries.

	Clinical risk groups						
	Chronic medical condition	**Immunologic disorders**	**HIV/AIDS**	**Long-term aspirin use**	**Any condition**	**Extreme Obesity**	**Residents of nursing home and other chronic care facilities**
Afghanistan	no seasonal influenza vaccination policy						
Egypt	R[1]	R	R	NR	-	R	NR
Iran	R	R	R	-	R	R	R
Iraq	R	R	R	R	R	R	R
Jordan	R	NR[3]	NR	NR	-	NR	NR
Kuwait	R	R	R	R	R	R	R
Lebanon	R	NR	NR	NR	NR	NR	NR
Libya	R	R	R	R	R	R	R
Morocco	no seasonal influenza vaccination policy						
Oman	R	R	R	NR	NR	NR	NR
Pakistan	no seasonal influenza vaccination policy						
Palestine	R	R	R	NR	R	R	R
Qatar	R	R	R	R	R	-	R
Saudi Arabia	R	R	R	R	R	R	R
Somalia	no seasonal influenza vaccination policy						
Sudan	no seasonal influenza vaccination policy						
Syria	R	R	R	-	R	R	NR
Tunisia	R	R	-[2]	NR	R	R	-
UAE	R	R	R	-	-	R	R
Yemen	no seasonal influenza vaccination policy						

[1]R, recommended

[2]-, no data

[3]NR, not recommended[4]UAE, United Arab Emirates

Table 2

Seasonal influenza vaccine recommendations for women during pregnancy and early postpartum period by EMR countries.

Country	Risk factor	
	Pregnant women	Women up to two weeks post-delivery
Afghanistan	no seasonal influenza vaccination policy	
Egypt	NR	NR
Iran	R	-
Iraq	R	R
Jordan	R	
Kuwait	R	R
Lebanon	NR	NR
Libya	R	R
Morocco	no seasonal influenza vaccination policy	
Oman	R	
Pakistan	no seasonal influenza vaccination policy	
Palestine	R	-
Qatar	R	-
Saudi Arabia	R	-
Somalia	no seasonal influenza vaccination policy	
Sudan	no seasonal influenza vaccination policy	
Syria	R	NR
Tunisia	R	NR
UAE	R	-
Yemen	no seasonal influenza vaccination policy	

Table 3

Seasonal influenza vaccine recommendations for HCWs by EMR countries.

Country	Health-care setting			
	Hospitals	Out-patients care clinics	Laboratories	Long-term facilities
Afghanistan	no seasonal influenza vaccination policy			
Egypt	R	R	R	R
Iran	R	-	R	R
Iraq	R	R	R	R
Jordan	R	R	R	R
Kuwait	R	R	R	R
Lebanon	R	NR	NR	NR
Libya	R	R	R	R
Morocco	no seasonal influenza vaccination policy			
Oman	R		R	R
Pakistan	no seasonal influenza vaccination policy			
Palestine	R	R	R	R
Qatar	R	R	R	R
Saudi Arabia	R	R	R	R
Somalia	no seasonal influenza vaccination policy			
Sudan	no seasonal influenza vaccination policy			
Syria	R	NR	NR	NR
Tunisia	R	NR	R	NR
UAE	R	R	R	R
Yemen	no seasonal influenza vaccination policy			

Table 4

Seasonal influenza vaccine recommendations for occupational groups by EMR countries.

Country	Work setting							
	Essential services (police, firemen, etc.)	Military services	Veterinary services	Poultry industry	Families that raise pigs, poultry or waterfowl	Airline workers	Investigators of human influenza outbreaks	Investigators of animal influenza outbreaks
Afghanistan	no seasonal influenza vaccination policy							
Egypt	-	-	R	-	-	R	R	R
Iran	R	R	R	R	-	R	R	R
Iraq	R	R	R	R	R	R	R	R
Jordan	NR	NR	NR	NR	NR	NR	R	-
Kuwait	R	R	NR	NR	NR	R	R	NR
Lebanon	NR	NR	NR	NR	NR	NR	NR	NR
Libya	R	R	R	R	-	-	R	R
Morocco	no seasonal influenza vaccination policy							
Oman	NR	R	NR	NR	NR	NR	NR	NR
Pakistan	no seasonal influenza vaccination policy							
Palestine	NR	NR	NR	NR	NR	NR	R	NR
Qatar	-	-	-	-	-	R	R	R
Saudi Arabia	NR	NR	NR	NR	NR	NR	R	R
Somalia	no seasonal influenza vaccination policy							
Sudan	no seasonal influenza vaccination policy							
Syria	NR	NR	NR	NR	NR	-	R	NR
Tunisia	R	R	R	R	NR	R	R	R
UAE	R	-	-	-	-	R	-	-
Yemen	no seasonal influenza vaccination policy							

Table 5

Seasonal influenza vaccine recommendations for residents of long-term facilities and household contacts of whom seasonal influenza vaccine is recommended by EMR countries.

Country	Risk group		
	Residents of long-term care facilities (nursing homes and other chronic-care facilities)	**Household contacts and caregivers of children younger than 5 years and adults aged 50 years and older**	**Household contacts of persons for whom vaccination is recommended**
Afghanistan	no seasonal influenza vaccination policy		
Egypt	NR	NR	-
Iran	R	-	R
Iraq	R	NR	NR
Jordan	R	NR	NR
Kuwait	R	R	R
Lebanon	NR	NR	NR
Libya	R	R	R
Morocco	no seasonal influenza vaccination policy		
Oman	NR	NR	NR
Pakistan	no seasonal influenza vaccination policy		
Palestine	R	NR	NR
Qatar	R	-	-
Saudi Arabia	NR	NR	NR
Somalia	no seasonal influenza vaccination policy		
Sudan	no seasonal influenza vaccination policy		
Syria	NR	NR	R
Tunisia	R	R	R
UAE	-	R	R
Yemen	no seasonal influenza vaccination policy		

Table 6

Seasonal influenza vaccine recommendations for pilgrims, expatriates, and/or refugees by EMR countries.

Country	Risk group		
	Pilgrims	Expatriates	Refugees
Afghanistan		no seasonal influenza vaccination policy	
Egypt	R	NR	
Iran	R	NR	NR
Iraq	R	NR	R
Jordan	R	NR	NR
Kuwait	R	NR	R
Lebanon	R	NR	NR
Libya	R	-	R
Morocco		no seasonal influenza vaccination policy	
Oman	R	NR	NR
Pakistan		no seasonal influenza vaccination policy	
Palestine	R	NR	NR
Qatar	R	-	-
Saudi Arabia	R	NR	NR
Somalia		no seasonal influenza vaccination policy	
Sudan		no seasonal influenza vaccination policy	
Syria	R	-	R
Tunisia	R	NR	R
UAE	R	-	-
Yemen		no seasonal influenza vaccination policy	